

## What is inquiry-based learning?

An old adage states: "Tell me and I forget, show me and I remember, involve me and I understand." The last part of this statement is the essence of inquiry-based learning, says our workshop author **Joe Exline**

Inquiry implies involvement that leads to understanding. Furthermore, involvement in learning implies possessing skills and attitudes that permit you to seek resolutions to questions and issues while you construct new knowledge.

"Inquiry" is defined as "a seeking for truth, information, or knowledge -- seeking information by questioning." Individuals carry on the process of inquiry from the time they are born until they die. This is true even though they might not reflect upon the process. Infants begin to make sense of the world by inquiring. From birth, babies observe faces that come near, they grasp objects, they put things in their mouths, and they turn toward voices. The process of inquiring begins with gathering information and data through applying the human senses -- seeing, hearing, touching, tasting, and smelling.

Unfortunately, our traditional educational system has worked in a way that discourages the natural process of inquiry. Students become less prone to ask questions as they move through the grade levels. In traditional schools, students learn not to ask too many questions, instead to listen and repeat the expected answers.

Memorizing facts and information is not the most important skill in today's world. Facts change, and information is readily available -- what's needed is an understanding of how to get and make sense of the mass of data.

Educators must understand that schools need to go beyond data and information accumulation and move toward the generation of useful and applicable knowledge . . . a process supported by inquiry learning. In the past, our country's success depended on our supply of natural resources. Today, it depends upon a workforce that "works smarter."

Through the process of inquiry, individuals construct much of their understanding of the natural and human-designed worlds. Inquiry implies a "need or want to know" premise. Inquiry is not so much seeking the right answer -- because often there is none -- but rather seeking appropriate resolutions to questions and issues. For educators, inquiry implies emphasis on the development of inquiry skills and the nurturing of inquiring attitudes or habits of mind that will enable individuals to continue the quest for knowledge throughout life.

## Outcomes of Inquiry

An important outcome of inquiry should be useful knowledge about the natural and human-designed worlds. How are these worlds **organized**? How do they **change**? How do they **interrelate**? And how do we **communicate** about, within, and across these worlds? These broad concepts contain important issues and questions that individuals will face throughout their lives. Also, these concepts can help organize the content of the school curriculum to provide a relevant and cumulative framework for effective learning. An appropriate education should provide individuals with different ways of viewing the world, communicating about it, and successfully coping with the questions and issues of daily living.

While questioning and searching for answers are extremely important parts of inquiry, effectively generating knowledge from this questioning and searching is greatly aided by a conceptual context for learning. Just as students should not be focused only on content as the ultimate outcome of learning, neither should they be asking questions and searching for answers about minutiae. Well-designed inquiry-learning activities and interactions should be set in a conceptual context so as to help students accumulate knowledge as they progress from grade to grade. Inquiry in education

should be about a greater understanding of the world in which they live, learn, communicate, and work.

### **How does it differ from the traditional approach?**

In general, the traditional approach to learning is focused on mastery of content, with less emphasis on the development of skills and the nurturing of inquiring attitudes. The current system of education is teacher centered, with the teacher focused on giving out information about "what is known." Students are the receivers of information, and the teacher is the dispenser. Much of the assessment of the learner is focused on the importance of "one right answer." Traditional education is more concerned with preparation for the next grade level and in-school success than with helping a student learn to learn throughout life.

Traditional classrooms tend to be closed systems where information is filtered through layers to students. In general, the use of resources is limited to what is available in the classroom or within the school. Use of technology is focused on learning about the technology rather than its application to enhanced learning. Lesson plans are used to organize the various steps in the learning process for the whole-class approach. On-target questions that would tend to cause deviations from the plan are met with, "We will get to that later."

The inquiry approach is more focused on using and learning content as a means to develop information-processing and problem-solving skills. The system is more student centered, with the teacher as a facilitator of learning. There is more emphasis on "how we come to know" and less on "what we know." Students are more involved in the construction of knowledge through active involvement. The more interested and engaged students are by a subject or project, the easier it will be for them to construct in-depth knowledge of it. Learning becomes almost effortless when something fascinates students and reflects their interests and goals.

Assessment is focused on determining the progress of skills development in addition to content understanding. Inquiry learning is concerned with in-school success, but it is equally concerned with preparation for life-long learning.

Perhaps a good way to summarize the important difference between traditional learning and inquiry learning is: Traditional learning focuses more on LEARNING ABOUT THINGS, while inquiry learning focuses more on LEARNING THINGS! Another useful way to contrast the two might be: Thinking WHAT as opposed to thinking HOW.

### **What does it have to do with my classroom?**

Most of our schools focus on teaching a set of basic skills that do not serve the needs of modern society. Traditionally, schools stressed the accumulation of information, and did not emphasize skill development or nurturing inquiry-based habits of mind. This approach to education was adequate when the United States was a largely rural society, depending on unskilled labor. Our modern society is faster paced, globally networked, technologically oriented, and requires workers who can problem solve and think critically. Today, much learning, if not most, occurs after formal schooling. Our schools must change their approach to education to produce students who can thrive in the modern world.

The traditional focus of education is no longer appropriate. The world has changed: local apprenticeships are rare, and young people must master new ways of acting and thinking.

Our society is becoming increasingly larger and more complexly diverse. Young people must develop an understanding for the complexities of modern life and be able to grapple with new ethical and practical issues. We must educate our young so they can participate as responsible members in contemporary society. They also need to be given the chance to grow and develop fulfilling personal identities in settings that are relatively free of risk.

"Habits of mind" should be an important goal, or outcome, in education. These habits can produce a world view that incorporates different disciplines or subjects. They can be thought of as the "ground rules" for a particular discipline, and include, but are not limited to, verification and respect for data in science, the importance of beauty and desirability in art, and the role of belief and faith in religion.

**STUDENTS DOING INQUIRY LEARNING** What does inquiry-based learning look like? Much of what is said about science and inquiry learning can be applied to all subjects. The following list describes some of what inquiry learning looks like in practice.

**Students view themselves as learners in the process of learning.**

- They look forward to learning.
- They demonstrate a desire to learn more.
- They seek to collaborate and work cooperatively with teacher and peers.
- They are more confident in learning, demonstrate a willingness to modify ideas and take calculated risks, and display appropriate skepticism.

**Students accept an "invitation to learn" and willingly engage in an exploration process.**

- They exhibit curiosity and ponder observations.
- They move around, selecting and using the materials they need.
- They confer with classmates and teacher about observations and questions.
- They try out some of their own ideas.

**Students raise questions, propose explanations, and use observations.**

- They ask questions (verbally and through actions).
- They use questions that lead them to activities generating further questions or ideas.
- They observe critically, as opposed to casually looking or listening.
- They value and apply questions as an important part of learning.
- They make connections to previous ideas.

**Students plan and carry out learning activities.**

- They design ways to try out their ideas, not always expecting to be told what to do.
- They plan ways to verify, extend, confirm, or discard ideas.
- They carry out activities by: using materials, observing, evaluating, and recording information.
- They sort out information and decide what is important.
- They see detail, detect sequences and events, notice change, and detect differences and similarities.

**Students communicate using a variety of methods.**

- They express ideas in a variety of ways, including journals, drawing, reports, graphing, and so forth.
- They listen, speak, and write about learning activities with parents, teacher, and peers.
- They use the language of learning, apply the skills of processing information, and develop their own "ground rules" appropriate for the discipline.

**Students critique their learning practices.**

- They use indicators to assess their own work.
- They recognize and report their strengths and weaknesses.

They reflect on their learning with their teacher and their peers.

This is a modified list based on "Inquiry-Based Science, What Does It Look Like?" published in CONNECT MAGAZINE, March-April 1995.

### **TEACHER'S ROLE IN AN INQUIRY CLASSROOM: FACILITATOR OF LEARNING.**

#### **The teacher reflects on the purpose and makes plans for inquiry learning.**

He plans ways for each learner to be actively engaged in the learning process.

She understands the necessary skills, knowledge, and habits of mind needed for inquiry learning.

He understands and plans ways to encourage and enable the learner to take increasing responsibility for his learning.

She insures that classroom learning is focused on relevant and applicable outcomes.

He is prepared for unexpected questions or suggestions from the learner.

She prepares the classroom environment with the necessary learning tools, materials, and resources for active involvement of the learner.

#### **The teacher facilitates classroom learning.**

The teacher's daily, weekly, monthly, and yearly facilitation plans focus on setting content learning in a conceptual framework. They also stress skill development and model and nurture the development of habits of mind.

She accepts that teaching is also a learning process.

He asks questions, encouraging divergent thinking that leads to more questions.

She values and encourages responses and, when these responses convey misconceptions, effectively explores the causes and appropriately guides the learner.

He is constantly alert to learning obstacles and guides learners when necessary.

She asks many Why? How do you know? and What is the evidence? type of questions.

He makes student assessment an ongoing part of the facilitation of the learning process.

This list was developed by Joe Exline.

### **Since inquiry activities do not lend themselves to standardized tests and other traditional assessment formats, do you have any suggestions for assessment tools that might be appropriate alternatives?**

**Arthur L. Costa:** Absolutely! No doubt about it, yes. Your point is very . . . is, I think, correct. You cannot measure inquiry-based learning with old-fashioned product-based assessment techniques. It doesn't work that way. Generally speaking, most of our public -- and many educators and many legislators -- think that what good learning or how good learning is measured are through a test. And there are a lot of problems with that because that's the knowledge that they have in their past. That's how they were assessed, and, therefore, they think that that's how kids ought to be assessed today. So we're spending an inordinate amount, an enormous amount of energy testing kids. And it's throwing a lot of energy down a sinkhole, as far as I'm concerned. Now I'm not saying we give up tests, but I am saying that we should have a balanced assessment program.

Testing does very well to measure kids' knowledge and skill acquisition. And that's fine. That's exactly what I want those tests to do. So I'm not suggesting throwing them out, but I am saying let's take a look at what can tests tell us about kids learning and use it in that way. Now when we get to inquiry-based learning, we're looking for another set of goals. We're looking at kids' ability to utilize these thinking skills, and that doesn't show up on the traditional tests.

Now I will also say that there are many states that are trying to develop tests in which kids have an opportunity to share their reasons why they chose the answer that they did. Tests where . . . if kids are given the choice of, you know, A, B, C, knowing what the right answer is, there's an opportunity to write in the reason for choosing that, and either choice might be applicable and acceptable. So there is a movement toward altering tests to make them more thinking-based and more to assess kids' reasoning ability. There's a movement to do that, but I don't think that's going to solve the problem entirely.

So what I want to do, then, is to develop some assessment strategies. Now I'm not saying "testing." I'm saying "assessment strategies" in which kids can demonstrate their knowledge in other ways, for example performances. Let us say that we want kids to develop their ability to conduct an experiment. Okay, I'm going to give them a task. I'm going to see whether they can control variables, to see whether they can draw conclusions, to see whether they can form hypotheses to see if they can analyze a problem and put it together and to come up with a logical conclusion. But that's going to take direct observation, and so I'm going to want to have checklists and performances that I'm going to be looking for as the students are solving their problem. So direct observation, checklists, and rubrics would be ways in which we could develop scoring systems to assess kids' performances of certain kinds of inquiry-based learning.

Furthermore, I want to see students over time. I'm not going to be satisfied with a one-time test to let me know whether kids have really acquired an inquiry approach. So I'm going to want to look at portfolios of students' work, writing samples. I want to collect many examples of students' work over time so that we see how they are solving problems in the 1st grade, 3rd grade, 9th grade, and 12th grade. And I want students to keep portfolios of their work, showing that they have become better inquirers and problem solvers across the grades.

So I want tests. I'm not going to throw those out. But I also want to buttress those tests with other forms of assessment, including such things as exhibitions, interviews, portfolios, writing samples, observations, checklists over time, having students do extended projects. And, furthermore, the real goal of assessment to me is to have students begin assessing themselves. So as students get up in the grades, I want to see the teacher fading away from assessing them and having students begin taking over their own assessment.

If our kids graduate from school and they're still dependent upon the adults to tell them when they're right, tell them when they're wrong, tell them when they're good, tell them when they're adequate, tell them what's an A, we've missed the whole point of what education is about. So I want to see kids start assessing themselves, where they develop criteria, where they apply those criteria to their own work. Where they set standards for themselves, and they continuously raise those standards, so that we want to see kids become continuous learners rather than just be the subject of someone else's evaluation and assessment.